

INTEGRATING TECHNOLOGY INTO THE LEARNING AND TEACHING PRACTICE: How Far Has African Countries Gone?

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INTRODUCTION

Despite the promises and predictions made by educational researchers in the early 1980s, computers have not revolutionized education overnight, and few schools have invested whole-heartedly in computer technology (Honey, Culp & Spielvogel, 1999:21). Instead, in an effort to provide computer access to all learners at an affordable cost, despite the low ratio of computers to learners, and because some critics feel there is a lack of quality software or that technology is too complex, schools have often put computers in a single room where learners use them once a week under a specialty educator's supervision (Pullias, 1997:28; Coutts, Drinkwater & Simpson, 2001:228; Kuh, 2001:11).

Unfortunately, this practice has undermined the most valuable aspect of the computer, that is, its ability to cut across traditional learning areas' boundaries as a practical and useful tool. Nagata (1998:12) and Dresang (1999:24) compare the isolation of computers in laboratories to the body's immune response to a foreign intruder; by removing computers from the classroom and relegating them to an isolated laboratory, schools have effectively minimized the potential impact computers can have on learners' learning by turning the technology into a separate, unrelated learning area called "computer literacy." In this laboratory approach, Hope (1997:25) further argues, learners have access to about 1/150th of a computer in school, far from the critical level needed for this technology to have a major impact on educational practices or learning experiences of learners. The fatal flaw in taking computers out of the classroom, according to Taylor (2001:4), is that any information learned about the computers today will be obsolete by tomorrow. Only when computers are integrated into the curriculum as a vital element for instruction and are applied to real problems for a real purpose will learners gain the most valuable computer skill, that is, the ability to use computers as natural tools for learning (Bates, 2000:11).

From the foregoing paragraphs, it is clear that nowadays, more than ever before, computer proficiency needs to become a top priority among educators, learners and parents. Just as literacy has received the national government attention through the Adult Basic Education and Training Programmes, computer proficiency or computer literacy needs to be addressed with similar high level and grassroots efforts. In fact, the two

campaigns share many common features and, in the end, achieve many of the same goals. Brantmeier (2004:279) argues that computer literacy and proficiency, which is a familiarity with the use and value that computers, software and related technologies can bring to human everyday lives, can provide individuals of all ages with new opportunities and open new worlds to them. Just as learning to read prepares people to work and live in the “real world,” learning to use a computer as a tool plays a similar role. Computers and software can also play a major role in improving the educational skills of learners and in preparing them for the next century. With computers, software and people working together, the possibilities of human resources’ development are infinite (Zehr, 1997:24; Simpson & Payne, 2002 12; Roach, 1999:92; Eurydice, 2001:32).

Of equal importance, most computer literacy studies, according to Tiene and Luft (2001:23), address how unprepared today's learners are to compete in today's technology age. Future Forecasting of Menlo Park, California, predicts that by the year 2010 virtually every job in America will require some use of computer technology. This makes it imperative for learners to become more familiar with technology. Devit and Palmer (1999:136) maintain that computers represent a classroom and home learning tool for today, as well as a strategic business tool for tomorrow. It is for this reason that learners, educators and parents should be computer literate (Hope, 1997:30). In addition to technology being an important element for maintaining and strengthening the individual learning skills of learners, technology can also play a role in addressing key national concerns. For example, effective use of technology as a classroom-learning tool can help alleviate critical problems including the rising number of high school dropouts and the growing rate of illiteracy (Chapelle, 1998:26; Kramsch, 2000:13). Because learning with the assistance of a computer is very individualized (and often more fun), learners tend to be more willing to run through routine drills and comprehension exercises. As a result, educators are finding that learners are more eager to sit down and concentrate on lessons using a computer than ones using more traditional workbook and textbook materials (Frose-German & Moll, 1998:45).

- At the same time, computers have been found to help bolster a learner's self-esteem and self-confidence (Todd, 2000:63). A 1989 Business Week commissioned study on education in America cites low self-esteem and a feeling of not being accepted by their peers as the number one reason for high school learners dropping out of school before completing grade twelve (Conole, 1999:21). The following facts about how learners are doing at school as listed by Large and Beheshiti (2002:71) are staggering:
- a major percentage of learner population does not read or even speak English, which is the main language of business in South Africa today. According to Nation's Business, more than 40 million adults or 30 per cent of the American adult population cannot read, write or reason well enough to

compete in today's economy and the number of functional illiterates is growing each year by an estimated 2.3 million;

- in a survey of youth skill levels conducted by the National Assessment of Education Progress (NAEP), American 13 year olds were found to have the lowest Mathematics and Physical Science scores of the six industrial countries surveyed (Loertscher & Woolls, 2001:42);
- it will take fifty per cent improvement by the year 2010 for the United States to match the Japanese and Europeans in functional literacy, general science and worker ,training, according to Business Week reports (Hirsh, 1999:65); and
- high school dropout rates in the United States are climbing at exponential rates, and have reached as high as 700,000 in one year. In some inner city areas, as many as 30 per cent of American youth drop out before completing high school (Bailey, 2004:4);

Twigg (2001:22) argues that if technology is to contribute to the solution of solving the foregoing problems, schools need to 'increase the number of computers available in schools. But, that is only the start. An important element of the equation is to forge partnerships among government, businesses, educators, parents and learners in an effort to use computers more effectively in education and community centres. As partners, communities and governmental agencies such as the Departments of Education, Technology and Communications need to concentrate on improving the way technology is used in the classroom and in homes (Anderson, 2003:5). This move, according to Simpson and Payne (2002:32) will help promote improved learning for learners, and at the same time, make computers more accessible to all learners and adolescents of school-going ages, from rural and school learners to those learning in urban schools.

Computers offer learners highly individualized learning experiences. In addition, according to findings outlined in *Power On!* These individual computer experiences have proved to be more comprehensive and motivating than traditional group classroom exercises (New, 1999:83; Pauw, 2002:39). The study notes that elementary learners who received brief daily computer-aided teaching lessons as a supplement to teaching showed gains equivalent to between one to eight months of teaching over their peers who received traditional teaching only (Martinez-Lage, 1997:34). Increases in learner attendance, motivation and attention span have also been reported. Brandl (2002:27) points out that computers can also be very accommodating, for example, they can reach learners at different study levels, any time of the day or night. Additionally, the sense of independence and accomplishment a computer offers helps learners fuel their self-confidence. Relying on a computer as a tool may be one of the most effective ways to build both a learner's learning skills and self-esteem (Richards, 2000:43).

As learners enter the workforce in the coming decades, they will undoubtedly discover that to continue to be effective in their jobs, they need to keep pace with the onslaught of new information. They will need to

continue to learn and to take advantage of new technologies that allow them to learn and work more efficiently and productively (Follansbee, 1997:15). It is for this reason that schools should make every effort now to introduce learners to technology (which includes the use of computers) as it can be used as a learning, creativity and productivity tool for everyone (Dunkel, 1999:13).

From both the international and national literature reviews' findings it is apparent that the integration of technology in the teaching and learning processes is a necessity if learners' latent learning potentialities are to be fully unlocked and well developed for the demands of the technologically oriented twenty-first century. In fact, all schools need to have computers for each learner if African countries especially Nigeria are to succeed in developing self-regulated learners who have the capacity to discover knowledge on their own through individualized learning on the computers (Conradie & Jacobs, 2003:30). All educators need to be proficient in teaching through computers. This means that computers with the necessary learning software can be an effective tool which educators can use to:

- develop learners' research skills;
- help learners discover new knowledge through surfing the internet;
- help learners develop self-regulated learning skills through working individually on their computers; and so on (Cronje, 2001b:28).

The latter paragraph highlights the need for all schools, which is not yet a reality, in South Africa to be equipped with computers for each learner in the classroom in order to enable him/her to be technologically competent and to be ready to discover new knowledge through self-regulated manipulation of the computer. The e-mail and the internet can be an effective tool for learners and educators to connect with schools, learners and educators all over the world for knowledge sharing, including cultural exchange (Jakovljevic, 2002:45).

Computers provide information - that is, both text, audio and graphic-based - about new areas of learning, new places, new shapes, new worlds (Ayres, 2005:241). Lamy and Goodfellow (1999:29) maintain that they stimulate new ways of thinking and analysing problems. With computers, people are free to "play" with the information and look at facts and ideas in different ways. While computers shouldn't eliminate the need for learners to memorise their multiplication tables, they can make memorising the facts a lot more fun. Hegelheimer and Tower (2004:185) further acknowledge that computers add a new, third dimension to data. It is almost as if personal computer software adds some personality to routine facts. And for learners, that added zest can be the key to more productive and focused study sessions.

Increased access to information is another benefit that can be realised when computers are integrated into learners' learning experiences. Just as more immediate access to information via personal computers has been instrumental in providing Fortune 500 and small companies with business advantages over their competitors, computers offer advantages for learners (Osuna & Meskill, 1998:17; Warschuer, 1997:470). Today, computer users young and old can access information through hundreds of online information and database services (Barcelo, 2004:275). And with the increased storage capabilities offered by CD-ROM technology, the computer is able to take on even more critical roles as "information grabbers" and organizers for

individuals, schools and businesses. It is clear that learners who become computer literate today will be better prepared to take on future academic and professional challenges with the aid of computers and software (Kafai & Bates, 1997:103).

However, despite the general sense that the computer revolution of the last decade has had a major impact in schools in African countries, the nature of this impact seems to be limited to access and information retrieval rather than improved teaching methods or revitalized school and classroom structures (Moore, 2000:62). The following constraints and barriers have been acknowledged:

- ❖ access to hardware and software as well as funding;
- ❖ time for planning, personal exploration, online access, and skill development;
- ❖ technical and administrative support and resources; training and expertise;
- ❖ resistance, passivity, school cultures, and traditions of teaching;
- ❖ vision and leadership; and
- ❖ support for integration of technologies into instruction and the curriculum (Hope, 1997:29; Loggett & Persichitte, 1998:33; Jacobs & Rodgers, 1999:9; Amos, 1999:126; Lan, 2000:21; Huber & Morreale, 2002:23; Mawson, 2003:117; Osborn, Peterson, Sampson & Reardon, 2003:356; Stoll, Fink & Earl, 2003:47; Lee, 2004:21; Munn, Stead, McLeod & Brown, 2004:433).

Candy and Bruce (2000:34) have grouped these barriers into the following two categories:

- i. first-order barriers extrinsic to educators such as access, time, support, resources, and training; and
- ii. second-order barriers intrinsic to educators such as attitudes, beliefs, practices, and resistance

Salaberry (2000:34) further asserts that even if every first-order barrier were removed, educators would not automatically use technology and in fact, rather than being eliminated completely, such barriers will continue to ebb and flow throughout the evolutionary integration process.

A comprehensive look at class technology in a series of articles by Jegede (2002:26), which shared several interesting facts about the state of computer technology in public education in Nigeria has revealed the following:

- i. the dividends that educators can expect from this unprecedented support for classroom technology are not yet clear. There is no guarantee that technology improves learner achievement” (Ayres, 2005:244);
- ii. 43% of respondents in a survey felt that the introduction of computers into public classroom was not happening fast enough (Kerr, 2005:1005);
- iii. despite the lack of research evidence, 74% of the public and 93% of educators agreed that computers indeed improved the quality of education, teaching, and learning (Burns-Glover, 2001:12);
- iv. research on the effects of technology on learner achievement offers mixed results (Young & Figgins, 2002:144);
- v. placing computers and software in classrooms is not enough. Discovering whether technology “works” is not the point. -The real issue is when and under what circumstances. Like any other tool, educators have to come up with a strategy or pedagogy to make it work (Bilal, 2002:70);
- vi. wise use of technology takes adequate training, time, planning, support, and educator ownership (Campbell & Salazar, 2004:5); and
- vii. money spent on school technology is wasted without an equal effort to help educators with its use and integration into the curriculum (Meskil, Mossop, Diangelo & Pasquale, 2002:30).

CONCLUSION

This research investigated, by means of a literature review the extent to which integration of computer technology has been implemented in schools. The researcher hopes that the contributions made in the form of suggestions will help school governing bodies and school management teams in African countries see the need for the integration of computer technology in the teaching and learning settings of the twenty-first century.

RECOMMENDATIONS

The analysis of this research led to the following recommendations, which have implications for integration of computers in the classrooms:

- i. Schools should employ educators who have been academically and professionally educated and trained in computer technology;

- ii. School governing bodies and school management teams should strategically budget for computers for every learner in their schools;
- iii. School Governing Bodies and School Management Teams should be skilled on computer technology strategic management.
- iv. Schools should work with families and communities. Working together with parents and the business community call facilitate financial and material donations for computer purchase and acquisition. Business people can always donate computers or funds for their purchase because they know that computer literate graduates from schools are assets for both business and community.

REFERENCES

- ADEY, K. 2000. 'Professional Development Priorities: the View of Middle Managers in Secondary Schools', *Educational Management & Administration* 28(4): 4 19-3 1.
- AGEE, A.S. & HOI-ISKY, D.A. 2004. "Technology Across the Curriculum." *Education and Technology: An Encyclopedia*. [In A. Kovalchick and K. Dawson. Santa Barbara, CA: Jossey-Bass].
- AGEE, A.S. & ZENELIS, J.G. 2002. "Technology Across the Curriculum: Information Literacy and IT Fluency." *Technology Everywhere: A Campus Agenda for Educating and Managing Workers in the Digital Age*. [In B. L. Hawkins, J. A. Rudy and W. H. Wallace. San Francisco: Jossey-Bass, 93-101].
- ANKIEWICZ, P.J. 1995. 'The Planning of Technology Education in South African Schools', *International Journal of Technology and Design Education*, 5(3): 245-254.
- ANKIEWICZ, P.J. & DE SWARDT, A. E. 2002. Aspects to be Taken into Account when Compiling a Learning Programme to Support Effective Facilitation of Technology Education, National Conference for Technology Educators, Port Natal School, Durban: Conference Proceedings.
- ANKIEWICZ, P.J. SWARDT, A. E. & STARK, R. 2000. *Technology Education: Principles, Methods and Techniques of Technology Education I*. Johannesburg: RAU College for Education and Health (RAUCEH).
- ANKIEWICZ, P. VAIU RENSBERG, S. & MYBURGH, C. 2001. 'Assessing the attitudinal technology profile of south african learners': a pilot study. *International Journal of Technology and Design Education*, 11(2): 93- 109.
- ARZIKA, M. 2000. National Policy on Telecommunication. web:] <http://www.ncc.gov.ng> [Date of access 2003/08/15]. ASCOUGH, RICHARD S. 2002. "Designing for Online Distance Education: Putting Pedagogy before Technology." *Teaching Theology & Religion*, 5(1): 17-29.

- BAILEY, M. 2004. Technology-based language and culture projects at the University of Texas at Austin. *Emerging Technologies for Teaching Foreign Languages and Cultures*,
- BATES, A. 2000. Managing Technological Change: Strategies for College and University Leaders. San Francisco, CA: Jossey-Bass.
- BELD, T. 2004. The technology-enhanced language classroom: Pedagogically informed technology for second language acquisition. [In Y. Saito-Abott, Donovan, R. & Abbot, T. *Emerging Technologies in Teaching Languages and Culture*. pp. 43-48 San Diego, CA: LARC Press].
- BELLO, H. M. 2003. The role of information and communication technology in the fight against poverty - the: Nigerian experience. Paper presented at the Symposium on ICT and ,the Society of Information. 9th-11th December 2002. Algiers.
- BEIVDER, E. & GRAY, D. 1999. The scholarship of teaching. *Research and Creative Activity*, 22(1): 1-176.
- BEIVJAMIN, L., NODINE, B., ERNST, R. & BROEKER, C. 1999 *Activities Handbook for the Teaching of Psychology: Volume 4*. Washington, DC: American Psychological Association.
- BERG, B. L. 2003. Qualitative research methods for the social sciences (5th ed.). Boston: Allyn & Bacon.
- BILAL, D. 1998. Children's search processes in using World Wide Web search engines: An exploratory study. Proceedings of the 61st ASIS Annual Meeting, 35, October 25-29, Pittsburgh, PA: Allyn & Bacon.
- BILAL, D. 1999. Web search engines for children; A comparative study and performance evaluation of Yahoo!igans!, Ask Jeeves for Kids, and Super Snooper. Proceedings of the 62nd ASIS Annual Meeting, 36, October 31-Nov. 4, Washington, D.C: Allyn & Bacon.
- BILAL, D. 2000. Children's use of the Yahoo!igans! Web search engine. Cognitive, physical, and affective behaviors on fact-based tasks. *Journal of the American Society for Information Science*, 51 (1): 646- 665.
- BILAL, D. 2001. Children's use of the Yahoo!igans! Web search engine. II. Cognitive and physical behaviors on research tasks. *Journal of the American Society for Information Science & Technology*, 52:2): 118-137.
- BILAL, D. 2002. Children's use of the Yahoo!igans! Web search engine. 111. Cognitive and physical behaviors on fully self-generated tasks. *Journal of the American Society for Information Science & Technology*, 53(1): 70-83.
- BOGDAN, R.C. & BICKLEN, S.K. 1998. Qualitative research for education: an introduction to theory and methods (3rd ed.). Boston: Allyn and Bacon.
- BONK, C.J, CUMMINGS, J.A., HARA, N., FISCHLER, R.B. & LEE, S.M. 2000. A ten-level web integration continuum for higher education: new resources, partners, courses, and markets. [In Abbey

- B, ed. *Instructional and cognitive impacts of web-based education*. University of Indiana].
- BRANDL, K. 2002. Integrating internet-based reading materials into the foreign language curriculum: From the educator - to student-centered approaches. *Language Learning and Technology*. web:] <http://ilt.nisu.edu>
- BRANTMEIER, C. 2003. Technology and second language reading at the university level: Informed instructors' perceptions. *The Reading Matrix*, Special Issue on Reading and Technology, 3(3): 50-74.
- BRANTMEIER, C. 2004. Technology and the individual: Students in control of advanced second language acquisition. *Emerging Technologies in Teaching Languages and Culture*. 279-299.
- BRENNAIV, T. H. & ROWE, C. 2004. "Information Literacy and Technology Across the Curriculum." Annual ASCUE Conference. North Myrtle Beach, SC, Association of Small Computer Users in Education.
- BROENS, C. J. A. M. & DE VRIES, M. J. 2003. Classifying Technological Knowledge for Presentation to Mechanical Engineering Designers,
- BROOKFIELD, S. & PRESKILL, S. 1999. *Discussion as a Way of Teaching*. San Francisco: Jossey-Bass.
- BROWN S. 1999. Reinventing the university. *Assoc Learning Technology*, 32(1): 30-37.
- BRYMAN, A. 2001. *Social research method*. New York: Oxford University Press.
- BURIVS-GLOVER, A. 2001. Culture, the Classroom, and Electronic Contacts: Tack Story and Email Communications." *The Journal of Education, Community and Values*, 1 (1): 1-64.
- BUSH, M. D. 1997. Implementing technology for language learning. [In M.D. Bush & R. M. Terry (Eds.). *Technology-enhanced Language Learning*. Lincolnwood: National Textbook Company].
- CAMPBELL, C. & SALAZAR, J. 2004. Exploring the development of language and thinking skills through technology. *Emerging Technologies in Teaching Languages and Culture*, 49(2): 2-54.
- CASEY, J. M. 1997. *Early Literacy: The empowerment of technology*. Englewood, CO: Libraries Unlimited.
- CEDEFOP. 2001. *E- learning and training in Europe: a survey into the use of e-learning in training and professional development in the European Union*, Thessaloniki: CEDEFOP.
- CHALHOUB-DEVILLE, M. 2001. Language testing and technology: Past and future. *Language Learning and Technology*, 5(2): 1-5. <http://ilt.msu.edu>

- CHELTON, M. K. & COOL, C. (Eds) 2004. Youth Information Seeking: theories, models and approaches. Lanham, WID: Scarecrow Press.
- COLE, R. 2000. Issues in Web-Based Pedagogy: A Critical Primer. Westport, CT: Greenwood Press.
- JAKOVLJEVIC, M. ANKIEWICZ, P. DE SWARDT, E. & GROSS, E. 2003. 'A synergy between the technological process and a methodology for web design: implications for technological problem solving and design'. *International Journal of Technology and Design Education*, 14(3): 261-290.
- JEGEDE, O. 2002. An integrated ICT-support for ODL in Nigeria. The vision, the mission and the journey so far. web:]. <http://www.ukhap.nic.in/ict/docs/s3/ieqede.doc>. [Date of access 2017/03/18].
- JOHNSEY, R. 1995. 'The design process - does it exist? A critical review of published models for the design process in England and Wales', *International Journal of Technology and Design Education*, 5(3): 199- 217.
- JOHNSON, S. D. 1997. 'Learning Technological Concepts and Developing Intellectual Skills', *International Journal of Technology and Design Education*, 7(1-2): 161-180.
- JONES, A. 1997. 'Recent research in learning technological concepts and processes'. *International Journal of Technology and Design Education*, 7(1-2): 83-96.
- JOSSEY- BASS, K. 2000. Analysis of student learning, growth, and performance in college and beyond through an extensive longitudinal study. Reflective practice is thematic across several chapters.
- Moersch, Christopher and Louis IW. FisherIII. "Electronic PortfoliosSome Pivotal Questions." *Learning and Leading with Technology*, 25 (5): 10-14.